

AGE AT PUBERTY IN RELATION TO PREPUBERTAL MEASURES OF PFOA – NEW FINDINGS

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Background and Aims: Polyfluoroalkyl compounds (PFCs), such as perfluorooctanate (PFOA) and perfluorooctane sulfonate (PFOS), have been reported to change mammary gland structure in laboratory animals and pubertal timing in humans. We explored the relationships between serum PFOA and PFOS concentrations and pubertal maturation in young girls.

Methods: Within the NIH Breast Cancer and the Environment Research Program, we conducted a study of PFC environmental biomarkers, including PFOA and PFOS, in young girls (age 6-7 years at entry) from two sites (N=688 girls). Pubertal staging (breast and pubic hair) has been conducted by clinicians or trained research staff, every year or more frequently, for as long as six years. Using longitudinal analysis methods (time to event) we studied the relationship between PFOA and PFOS serum concentrations measured at the beginning of the study (2005-2006) with age at pubertal Stage 2.

Results: Median serum concentrations of PFOA and PFOS differed at the two sites (California: PFOA= 5.8 ng/ml, PFOS=12.5 ng/ml vs. Cincinnati PFOA =7.9 ng/ml, PFOS 14.0 ng/ml). Among girls at the Cincinnati site, we found a statistically significant relationship between PFOA serum concentration and age at Tanner breast Stage 2, and an inverse relationship between PFOS and age when Tanner pubic hair Stage 2 was first noted, with adjustment for race/ethnicity, body mass index percentile for age, caregiver education and mother's age at menarche. Neither of these relationships reached statistical significance among the girls at the California site.

Conclusions: PFOA and PFOS may act as endocrine disruptors, affecting the timing of pubertal maturation in humans.

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